

# How the Mighty Have Fallen: An Examination of Factors Into Restaurants Closing in Las Vegas

Yuqing (Candice) Zhang

Computational Social Science, University of Chicago

## Why Restaurants Failed?

“What factors will lead to your low rating for a restaurant?”

- 1 – Food
- 2 – Location
- 3 – Service

And... How about those yelpers?

## Purpose

Currently there have been many articles talking about the determining factors of businesses' success. However, there hasn't been much research studying why businesses fail. This study aims to examine factors of restaurants closing.

## Hypotheses

Previous studies suggest location and service are two important factors leading to business fail. In addition, food plays a crucial role in restaurants close.

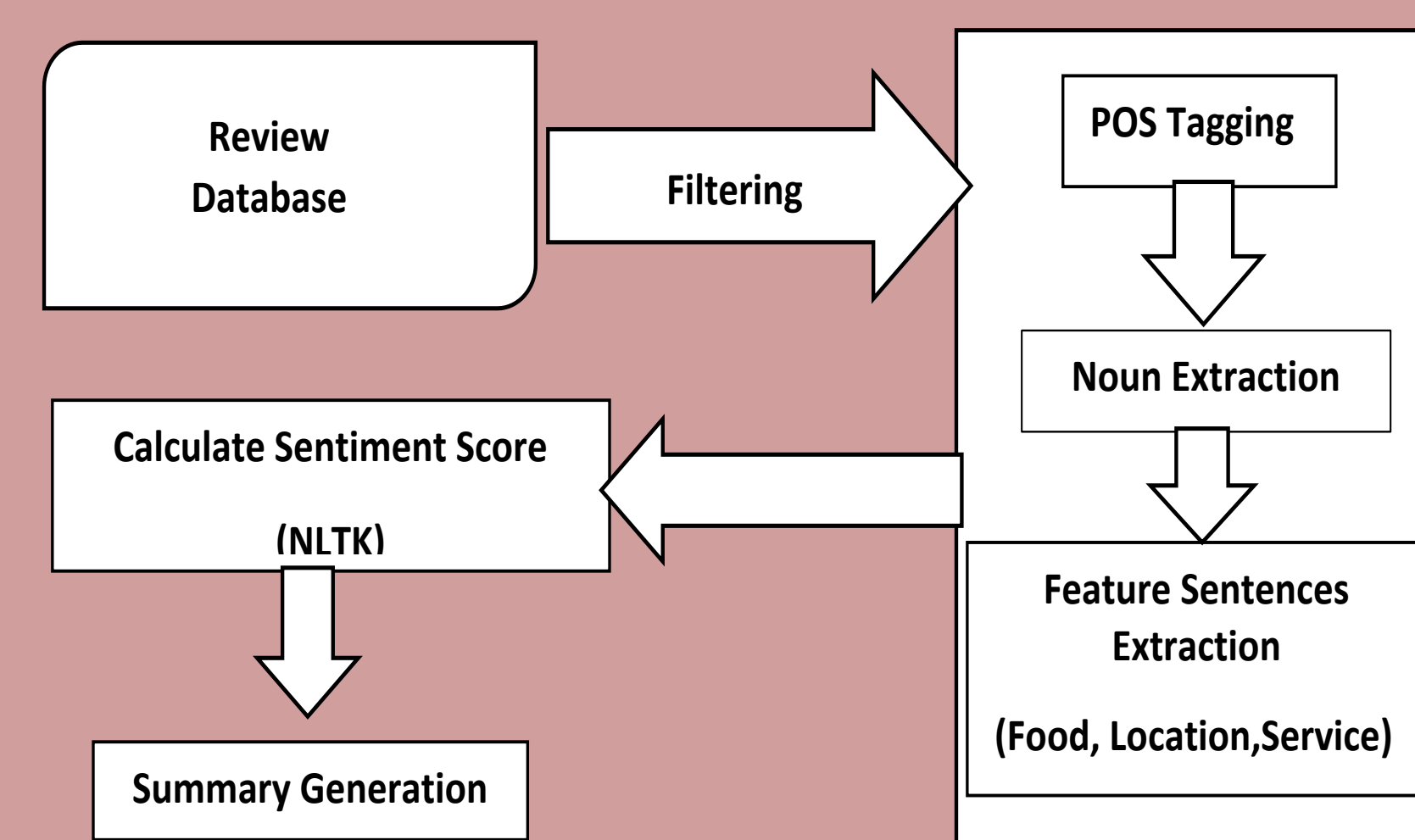
**H1:** Food, location and service are significant predictors in facilitating restaurants' continuation in business.

**H2:** Under each predictor, businesses that are still open received higher sentiment score than businesses that are close.

## Data

- Yelp reviews from 2012 to 2016
- 64991 reviews of 1645 closed restaurants
- 568433 reviews of 4090 open restaurants

## Method



- Part-of-Speech (POS) Tagging  
- NLProcessor Linguistic Parser
- Feature Sentence Extraction  
- Corpora of words pertain to feature
- Sentiment Analysis  
- NLTK : Sentiment Intensity Analyzer

## Model

According to the Generalized Linear Model, only Food and Location are the two significant factors that will lead to a restaurant close/open.

```
> reviews.fit <- glm(is_open ~ Food+Location+Service, data=reviews)
> summary(reviews.fit)

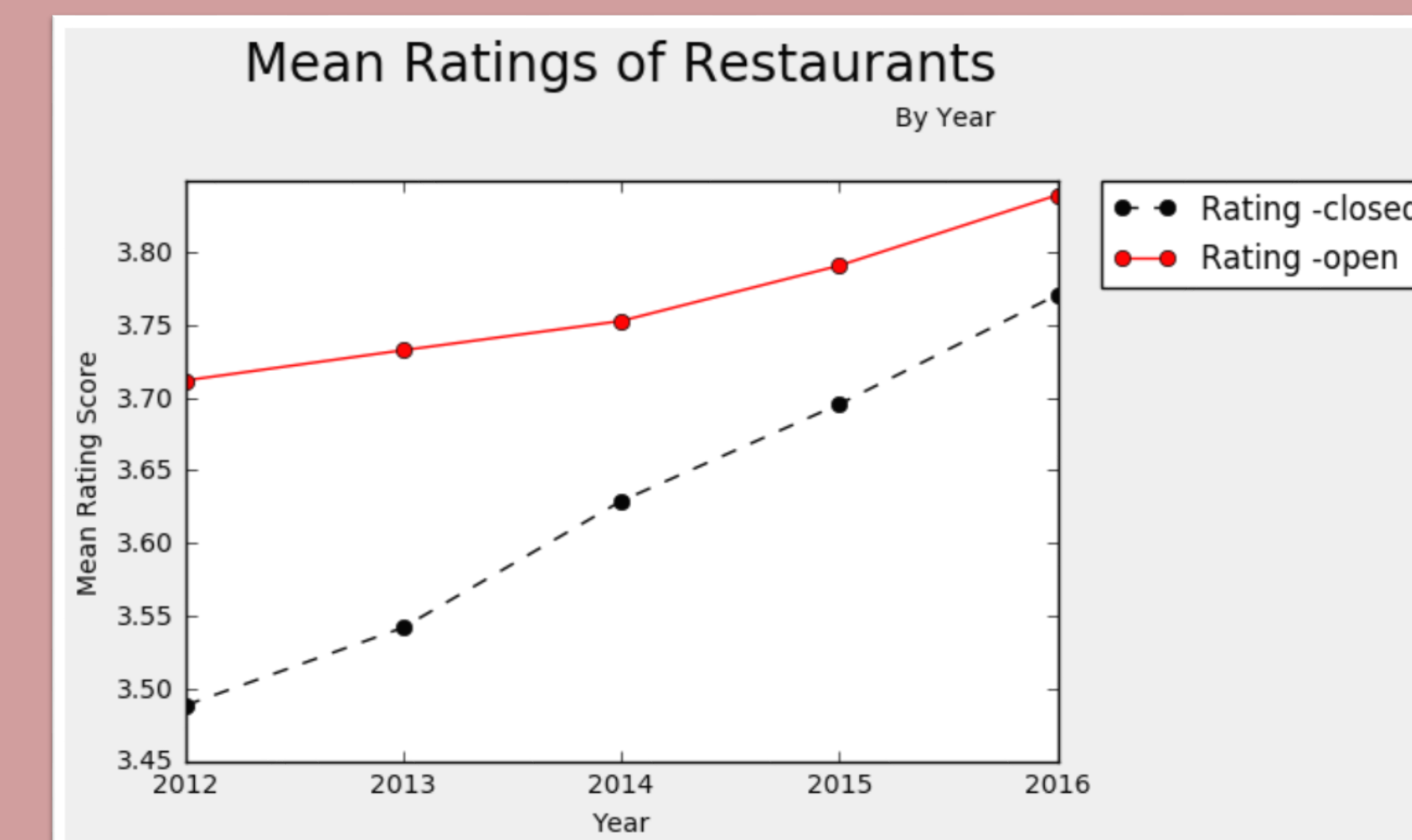
Call:
glm(formula = is_open ~ Food + Location + Service, data = reviews)

Deviance Residuals:
    Min       1Q   Median       3Q      Max 
-0.9197   0.1595   0.1741   0.1804   0.2747 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.831687   0.005006  166.146 < 2e-16 ***
Food         0.089426   0.017554   5.094 3.54e-07 ***
Location     0.053052   0.013659   3.884 0.000103 ***
Service      0.004114   0.011008   0.374 0.708631
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## Descriptive Statistics

Restaurants that are open received consistently higher rating than those that are close.

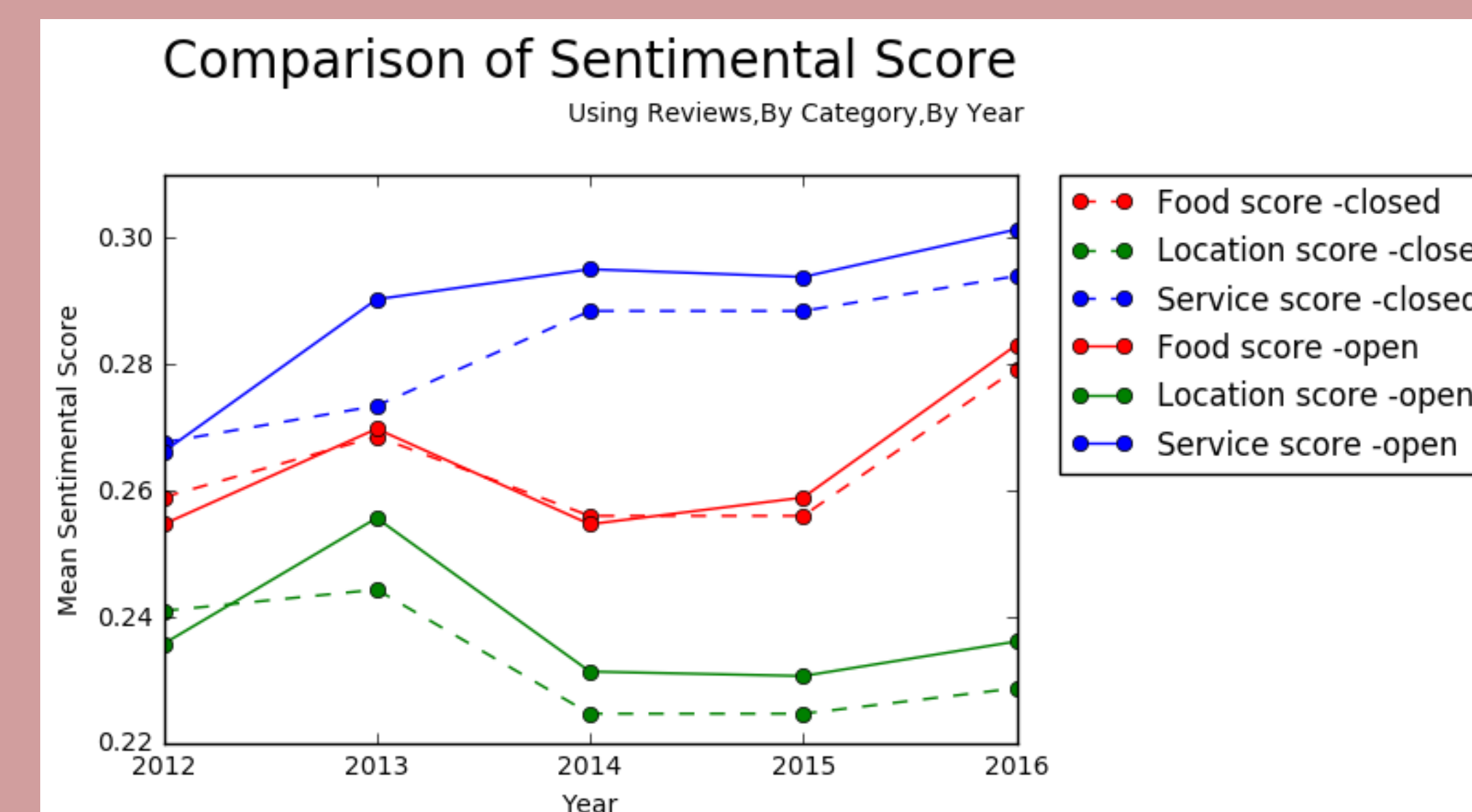


Distributional information on sentiment scores of all three categories for open and closed restaurants:

```
summary(year2012_close_df)
      Food      Location      Service
Min.   :-0.8881  Min.   :-0.85910  Min.   :-0.8881
1st Qu.: 0.1732  1st Qu.: 0.08261  1st Qu.: 0.0000
Median : 0.2648  Median : 0.25871  Median : 0.2743
Mean   : 0.2588  Mean   : 0.24099  Mean   : 0.2676
3rd Qu.: 0.3479  3rd Qu.: 0.38299  3rd Qu.: 0.4939
Max.   : 0.9657  Max.   : 0.96840  Max.   : 0.9606
```

```
summary(year2012_open_df)
      Food      Location      Service
Min.   :-0.5267  Min.   :-0.8422  Min.   :-0.7697
1st Qu.: 0.2098  1st Qu.: 0.1908  1st Qu.: 0.2083
Median : 0.2880  Median : 0.3069  Median : 0.3496
Mean   : 0.2729  Mean   : 0.2797  Mean   : 0.3365
3rd Qu.: 0.3477  3rd Qu.: 0.4019  3rd Qu.: 0.4998
Max.   : 0.9817  Max.   : 0.9908  Max.   : 0.9817
```

## Results



Mostly, under each predictor: food, location and service, restaurants that are still open have higher sentiment score than restaurants that are close.

## Conclusions

- Food and location are significant predictors in facilitating restaurants' continuation in business
- Reviews about food, location and service on open restaurants are generally more positive than those on closed restaurants

## Implications & Future Directions

- Further study on other factors and between-factor interaction effects
- Determinants of business failure as well as customer reviewing are multidimensional constructs, so we should consider the possibility of profile scores instead of individual scores on each predictor
- Longitudinal analysis tracking business operation over the years with continuation as an outcome

## Contact

Yuqing Zhang

5500 S Shore Dr.  
Chicago, IL 60637, USA



Find more information from  
<https://github.com/candicezhang521/MACS30200proj>  
[yuqing@uchicago.edu](mailto:yuqing@uchicago.edu)



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